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UROMYCES PULCHERRIMUS, B. & C.—Through the courtesy of Prof. F. L. Scribner, of the Agricultural Department, Washington, we have specimens of this species on leaves of *Abutilon holosericea*, collected by Dr. E. Palmer, in Mexico, agreeing accurately with specimens of this *Uromyces* on *Abutilon Texense*, from Dr. Farlow. In both these specimens, the spores are much more variable in size and shape than one would suppose from the description in Grevillea. They vary from nearly globose, 15—22 μ , to elliptical, or obovate, 20—26 x 14—16 μ , distinctly thickened and mostly rounded at the apex, but in the more elongated ones, obtusely pointed. In the Mexican specimens, also, some of the spores are uniseptate, with the septum often oblique, or even vertical. Septa were also observed, but more sparingly, in the specimens on *Abutilon Texense*.

NOTES ON PEZIZA.

Of all the families of fungi, none, perhaps, is more prolific in interesting and beautiful forms than that division of the Discomycetes, including the *Pezizas*. These are membranaceous, or more generally fleshy fungi of a discoid, or cup-shaped form, and growing either from the earth itself, or, oftener, from decaying wood or dead herbaceous stems. Like other fungi, they require for their growth and development a certain amount of moisture and of heat, though some of the species which grow on decaying wood appear to endure and even to flourish at a very low temperature. The beautiful *Peziza coccinea*, which grows on decaying limbs or pieces of decaying wood, partly buried in the ground, opens its scarlet-tinted cups in early spring, while yet the snow is only partly melted from the ground; while some of the smaller species that inhabit old logs appear in good condition late in the fall, even after the ground in the open fields is frozen. A species found by Mr. S. J. Harkness in the mountains of Utah (*P. earina*,—Gr. *ear*, spring) appears in full vigor on the decaying leaves of grasses still moist from the melting of the winter's snow. A very interesting species, from its unusual place of growth, is described by Dr. Cooke, in the Bulletin of the Buffalo Soc. Nat. Sci., March, 1875. The species grows from the decaying petals of *Magnolia*. The *Magnolia glauca*, near the northern limit of its growth, blossoms early in June. Soon after the petals have fallen, little cream-colored blotches, or swellings, will be noticed on some of them. These swellings are of a circular, or subelliptical shape, and about $\frac{1}{4}$ of an inch across. After a few days, they become darker colored and quite hard. If the affected petals happen to fall on dry ground, this swelling and discoloration proceeds no further; but as the *Magnolia* grows in swampy ground, many of the affected petals fall in the mud or water, and, when the leaves fall in the autumn, are pressed down and buried completely in the mud, where they lie through the winter. But when the spring returns again, and the *Magnolias* put forth their fragrant

blossoms, each little black swelling (sclerotium) in the buried petals, instinct with life, unfolds a hidden germ that sends up its tiny, thread-like stem through the overlying mass of decaying leaves and vegetable debris, bending and turning itself here and there, to avoid obstructions, on its way to the sunlight and the summer air, which having reached at length, it rises straight above the surface for $\frac{3}{4}$ of an inch or thereabouts, when its apex expands into a liver-colored, or circular disk about $\frac{1}{4}$ of an inch across, and slightly convex, or nearly plain above. The upper surface of this disk is covered with a layer of closely-packed, erect, cylindrical sacks, like the nap on velvet. Each of these sacks (asci) contains eight oblong-elliptical, transparent bodies called "sporidia," which are supposed to be capable of reproducing the species—*supposed*, we say, for all fungus spores are so minute that, although their germination may be readily watched under the microscope, it is hardly possible to follow the succeeding changes through all the different stages of development to the reproduction of a perfect specimen of a given species. It would be deeply interesting to know the exact manner in which this curious little plant perpetuates itself—how it is that, year after year, the fallen petals should continue to produce this wonderful little organism. It is not irrational to suppose, since the sporidia are readily discharged from the little sacks that contain them,—so abundantly, in fact that, in many of the larger species, they may be seen rising into the air, like steam or vapor, when the mature specimen is jarred or shaken,—that these sporidia find a lodgement on the petals, either before or after they have fallen from the tree, and, germinating, produce the swellings from which the mature *Peziza* will at length appear.

Another similar species (*P. incondita*) is found growing in company with the one just spoken of. There is the same black sclerotoid base, only, for the most part, larger ($\frac{1}{3}$ — $\frac{1}{2}$ of an inch across), convex on one side and concave on the other, sending up from some point in its margin a rather stout brown stem, expanding, as before, at its apex into a round, flat disk, producing asci and sporidia. This species differs from the first principally in its larger size and in the fact that the black sclerotium from which it grows is found lying among moss or on the bare soil, and not attached to any decaying leaf or other substance, nor buried in the mud, so that the stem, which is from $\frac{3}{4}$ to 1 inch high, rises perfectly straight and erect, without any tortuous base, as in the first-mentioned species, which had to force its way through the overlying mud and leaves.

Still a third species (*P. nyssægena*), somewhat similar to the two already mentioned, has been found growing from the bony seeds of the sour gum (*Nyssa*). The seeds, or nutlets, much resemble, in size and appearance, small cherry stones, and it is from one of the pointed ends that the stem of the *Peziza* proceeds, from the same point where the germ of the seed itself would have issued. The seeds producing this *Peziza*, like the petals in the first-mentioned species, are buried for an

inch or more in the soft mud where they chanced to fall, and into which, from their own weight, they would naturally sink. Here, again, we find the stem of the little parasite with an oblique, or tortuous base, from having to force its way through the overlying mud filled with decaying twigs and leaves that oppose its passage; but, on reaching the surface, it shoots up erect and straight to about the same height as the two already mentioned. The terminal disk, however, is rather thicker and has a decided tinge of flesh color. This species also appears later in the season (September to October), which fact, together with its different habitat and more robust growth, will readily distinguish it. How this remarkable parasite establishes itself in the nutlets of the gum tree is even more difficult to comprehend than in the case of the first-mentioned species, for the growth is not superficial, the stem of the *Peziza* issuing from the kernel of the fruit, whose bony envelope is cracked to admit its passage.

If the parasite reached maturity in the early part of the season, while the gum tree was still in blossom, we might imagine its sporidia floating in the air, to find lodgment on the stigma of the flower, though, in the single locality where it has as yet been found, the lowest branches on the single tree, from which the nutlets evidently fell, are at least twenty feet above the ground. We can only suppose, then, that the sporidia fall on the mature fruit, either while it is yet hanging on the tree or after it has fallen to the ground and, germinating, produce a mycelium which penetrates to the kernel within.

Other allied species have been described. *P. Curreiana*, a European species, grows from a sclerotium developed in the culms of *Juncus effusus* and *J. conglomeratus*, and also in culms of *Scirpus lacustris*. This is described as a very beautiful species, with dark-colored, very smooth hemispherical cups, which at length become funnel-shaped, 8—12 millim. across, borne on round, solid, subflexuous stems, 15—20 millim. long. The affected culms crack open in the spring, at the place where the sclerotium is formed, and from the cleft issue several (2—13) specimens of the *Peziza*, all from the same sclerotium. It is noted that, the greater the number of specimens, the smaller their size, and this also is the case with *P. gracilipes*. Occasionally, a *Magnolia* petal will be found perfectly mottled with small sclerotia, each of which produces one or more small *Pezizas*.

Another species (*P. Durieana*) is charmingly described by Tulasne in "Selecta Fungorum Carpologia." This species was first found by Durieu, in 1856, near the banks of the Garonne, in France. It arises from a sclerotium in the culms of *Carex arenaria* and comes to maturity in the latter part of June. The sclerotium is formed in the culms of the sedge, during the summer, but in the fall, the culms split open from the pressure of the included sclerotium, which then falls out and lies on the ground through the winter, ready, when summer returns, to mature its fruit. In the locality where it was first found, this parasite was so

abundant that, in a large patch of the *Carex*, hardly a culm could be found unaffected. It has since been found in other species of *Carex*, but not yet in this country. Sclerotia are not peculiar to any single genus of fungi—some produce Agarics, others, as the common ergot in rye, produce species of sphæriaceous fungi pertaining to the genus *Cordyceps*, and at least some species of *Aspergillus* grow from sclerotia which are now considered as the *condensed mycelium* of the various species connected with them, and are analogous to the resting spores in *Peronospora* and some other microscopic fungi. J. B. E.

NEW LITERATURE.

BY W. A. KELLERMAN.

"MILDEWS OF INDIANA." J. N. Rose, Botanical Gazette, March, 1886.

A list of eleven species—one of *Uncinula*, four of *Microsphaeria*, one each of *Podosphaera*, *Phyllactinia* and *Sphaerotheca* and three of *Erysiphe*—collected in the vicinity of Crawfordsville, Indiana. New host-plants are as follows: *Sambucus Canadensis* for *Microsphaera Grossulariæ*, Lev.; Persimmon and Quince for *Podosphaera oxacantha*, D. C., *Hieracium*, *Lactuca* and *Erigeron* for *Sphaerotheca Castagnei*, Lev.

"SOME EXOTIC FUNGI." By M. C. Cooke. Grevillea, March, 1886.

Descriptions of three species from India, five from Australia, and two from North America. The latter as follows: *Leptothyrium Liriodendri*, Cke., on leaves of *Liriodendron* and *Phoma cerasina*, Cke., on dead leaves of *Prunus lauro-cerasus*, both from Aiken, S. C.

"NEW BRITISH FUNGI." "SYNOPSIS PYRENOMYCETUM," "PRÆCURSORES AD MONOGRAPHIA POLYPORUM," "BRITISH SPHÆROPSIDÆÆ." By M. C. Cooke. 1. c.

"BEITRÄGE ZUR FLORA DER ROST- UND BRAND-PILZE (UREDINEEN UND USTILAGINEEN) THUERIGENS." Von G. Oertel. Deutsche botanische Monatsschrift, Dezember, 1885.

"A SKETCH OF THE BOTANICAL WORK OF THE REV. M. A. CURTIS, D. D." By Thos. F. Wood. Journal of the Elisha Mitchell Scientific Society, 1884-85.

"WEITERER BEITRAG ZU NEUEN PILZFORMEN AUS SLAVONIEN." Von Stephen Schulzer von Mueggenburg. Hedwigia, Januar und Februar, 1886. p. 9.

"NACHTRÄGE UND BERICHTIGUNGEN ZU SACCARDO'S SYLLOGE FUNGORUM, VOL. I, II." Von Dr. G. Winter (Fortsetzung). 1. c. pp. 10-28.